





Message

 TPH- Holding Lagoon Bio- Petro Hydrocarbons.doc (297 KB)  
 TRNSLTN\_SDS\_M1000H\_ENGLSH 05-15-2015 (2).docx (57 KB)  
 TRNSLTN\_SDS\_TRI-PHASIC 12-ENGLSH\_05-26-2015.docx (52 KB)  
 M1000PCB SITE Technology Profile.doc (929 KB)

**From:** Jeff Donohue [<mailto:jdonohue@micro-bac.com>]

**Sent:** Thursday, June 09, 2016 7:34 AM

**To:** Barber, Anthony <[Barber.Anthony@epa.gov](mailto:Barber.Anthony@epa.gov)>; Grandinetti, Cami <[Grandinetti.Cami@epa.gov](mailto:Grandinetti.Cami@epa.gov)>

**Subject:** Portland Harbor Superfund Site

Today I read a Google News story about treatment at the Portland Harbor Superfund Site. Micro-Bac International's M-1000H\* microbial solution and Tri-Phasic12 nutrient solution has been successfully used to treat organic contamination in a harbor bottom in Italy. The site was to be the location of a G-8 conference. It was successfully treated, but the location of the conference was changed to a different Italian city which had suffered earthquake damage. In 2011 Dr. Mauro Piccolo, (b) (6) was the environmental scientist who treated the harbor. I am sure that he would be happy to tell you about this success. He speaks excellent English and has lectured at various institutions in the US. He lives in Portogruaro, Italy, about 65 miles east of Venice.

The bottom line is that the site could be treated in place for substantially less money than what has been proposed. If you still chose to dredge, it could be treated in your containment area with no need to cap.

I would appreciate an opportunity to speak to you both about this Superfund Site.

Warmest Regards,

Jeff Donohue  
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# Bioremediation Products



## **Biodegradation of Petroleum Hydrocarbons in Holding Lagoon**

A holding lagoon's lined pit measured 150 feet by 75 feet and held materials with a depth of about six feet. This material consisted of tank bottom sludges, soils, sand, and metals. A layer of clear rain water covered about 30% of the solids with the balance breaking the surface in several large mounds.

Samples were taken for a treatability study as well as for analysis of Total Petroleum Hydrocarbons (TPH). TPH measured 600,000 ppm.

After positive microbial treatability results, an engine-driven 3 inch centrifugal pump was installed. The lagoon was inoculated with M-1000H\*™ and nutrients. The water was then drawn from the lagoon and reinjected using the pump and a stream straightener mounted on a fire hose. The water jet was used to hydraulically undermine the large mounds and distribute them throughout the lagoon. Also, other areas of the lagoon were manually excavated to assist in leveling the mounds prior to the water jetting.

The water became brownish and opaque within 48 hours of initiating this process. After about 10 weeks, a significant reduction of hydrocarbons was noted visually. Samples were taken from a variety of locations around the site and blended into the two composite samples. These were sent to an independent lab for testing. The results of those tests indicated that only 85000 ppm TPH remained.

The TPH of the lagoon's solids were reduced by more than 80%. Microbes and nutrients remain in the soils to continue the degradation process.



# SAFETY DATA SHEET

## Section 1: Identification

Product Identifier	<b>M-1000<sup>®</sup>H</b>
Manufacturer	<b>MICRO-BAC INTERNATIONAL, INC.<sup>®</sup></b> 3200 N. IH-35 Round Rock, TX 78681-2410 512 310 9000
Telephone	None
Emergency Telephone	None
Recommended Use	Used for the broad spectrum degradation of a variety of compounds found in contaminated and/or hazardous wastes
Restriction in Use	None

## Section 2: Hazard(s) Identification

Hazards	None
Required Label Elements	None

## Section 3: Composition/Information on Ingredients

Hazardous Components	None (TSCA 40 CFR 710.4 b)
Common Name	Microbial product: naturally occurring microorganisms

## Section 4: First-Aid Measures

Signs and Symptoms of Exposure	May cause gastric and/or intestinal upset
Emergency and First Aid Procedures	Ingestion: do not induce vomiting. Drink plenty of water Eye Contact: flush with clean water for 10 minutes

## Section 5: Fire-Fighting Measures

Flash Point	Not Applicable
Flammable Limits	Not Applicable
Extinguishing Media	Not Applicable
Special Fire Fighting Procedures	None
Unusual Fire & Explosion Hazards	None

## Section 6: Accidental Release Measures

Material Release or Spillage	Clean up with soap and water or with disinfectant
Waste Disposal Method	Flush with clean water
Work/Hygienic Practices	Routine

## Section 7: Handling and Storage

Handling and Storage Precautions	Store in tightly closed original container at temperatures between 13°C to 32°C
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# SAFETY DATA SHEET

## Section 8: Exposure Controls/Personal Protection

Ventilation Protection	None required
Respiratory Protection	None required
Personal Protection	None required but use of gloves and safety glasses is recommended

## Section 9: Physical and Chemical Properties

Specific Gravity	1,02
Boiling Point	100°C
Melting Point	0°C
Solubility in Water	Water soluble
Appearance and Odor	Light pink to tan liquid with moderate odor

## Section 10: Stability and Reactivity

Stability	Stable
Incompatibility	None
Conditions to Avoid	Extreme conditions
Hazardous Decomposition or Byproducts	None

## Section 11: Toxicological Information

Routes of Entry	Ingestion and/or eye contact
Carcinogenicity (NTP or IARC)	None



# SAFETY DATA SHEET

## Section 1: Identification

Product Identifier	<b>TRI-PHASIC 12™</b>
Manufacturer	<b>MICRO-BAC INTERNATIONAL, INC.®</b> 3200 N. IH-35 Round Rock, TX 78681-2410 512 310 9000
Telephone	None
Emergency Telephone	None
Recommended Use	Used to stimulate microbial activity in product applications for Micro-Bac International, Inc.® biological products where indigenous nutrients are insufficient to support optimal microbial activity
Restriction in Use	None

## Section 2: Hazard(s) Identification

Hazards	None
Required Label Elements	None

## Section 3: Composition/Information on Ingredients

Hazardous Components	Phosphates, Potassium, Nitrogen Compounds
Common Name	TRI-PHASIC 12™

## Section 4: First-Aid Measures

Signs and Symptoms of Exposure	May cause gastric and/or intestinal upset. May cause irritation to skin and/or eyes
Emergency and First Aid Procedures	Ingestion: do not induce vomiting. Drink plenty of water Eye and/or Skin Contact: flush with clean water for 10 minutes

## Section 5: Fire-Fighting Measures

Flash Point	Not Applicable
Flammable Limits	Not Applicable
Extinguishing Media	Not Applicable
Special Fire Fighting Procedures	Not Applicable
Unusual Fire & Explosion Hazards	None

## Section 6: Accidental Release Measures

Material Release or Spillage	Clean up with soap and water
Waste Disposal Method	Flush with clean water
Work/Hygienic Practices	Routine

## Section 7: Handling and Storage

Handling and Storage Precautions	Avoid contact with skin and/or eyes
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# SAFETY DATA SHEET

## Section 8: Exposure Controls/Personal Protection

Ventilation Protection	None required
Respiratory Protection	None required
Personal Protection	Rubber, plastic or cloth gloves and safety glasses

## Section 9: Physical and Chemical Properties

Specific Gravity	1.35-1.50
Boiling Point	>100°C
Melting Point	Not Applicable
Solubility in Water	Water soluble
Appearance and Odor	Dark brown layers with mild odor

## Section 10: Stability and Reactivity

Stability	Stable
Incompatibility	Reducing agents
Conditions to Avoid	Extreme conditions
Hazardous Decomposition or Byproducts	Nitrogen oxides

## Section 11: Toxicological Information

Routes of Entry	Ingestion, skin and/or eye contact
Carcinogenicity (NTP or IARC)	None



## **MICRO-BAC® INTERNATIONAL, INC.**

### **(Bioaugmentation Process)**

#### **TECHNOLOGY DESCRIPTION:**

The M-1000PCB™ is a biological product specifically designed and formulated for the degradation of chlorinated compounds and complex aromatic compounds found in contaminated and/or hazardous wastes. The M-1000PCB™ product consists of live, specially selected, naturally occurring microorganisms, along with a supply of balanced nutrients in a ready-to-use liquid medium. The microorganisms work either anaerobically or aerobically and the system requires no expensive machinery.

The product is nonpathogenic and free of slime-forming and sulfate-reducing bacteria. The live cultures contained in the product do not need to be activated or require an acclimation period prior to use. In a proprietary selection process, MBI isolates and sustains specific strains of bacteria that work together to degrade specific organic compounds. Reportedly, these microorganisms have the ability to thrive in a variety of site conditions characterized by diverse soils and water chemistries, and are capable of using hazardous waste substances as a carbon source.

For soil applications, the product is typically applied

via a spray, as shown in the photograph below. M-1000™ product and nutrient application rates for soil are based on specific site characteristics. Information such as soil type, nutrient availability, soil moisture content, and contaminant type and concentration are considered before applying the technology at a site. The general application rate for the M-1000™ products in soil is one quart of bacteria per one cubic yard of soil. This treatment provides a bacterial concentration of approximately 1,250 ppm. The bacteria is typically applied first, followed by the nutrient formulation.

At a number of sites, the addition of nutrients is used to augment the activity of the product in conditions where macronutrients such as carbon, nitrogen, or phosphate are limited. MBI produces its own nutrient mixtures that are specifically formulated for use with MBI bacteria. The nutrient mixtures are shipped as a dry powder and packaged in single packets or in four packet containers. A single packet of nutrients is typically mixed on-site with 55 gallons of water. This mixture is used to amend approximately 10,000 gallons or 50 cubic yards of the bacteria mix.

Depending upon the duration of treatment, it is often necessary for multiple applications of microbe and



nutrient mixtures. The treated soil is then routinely mixed with a roto-tiller. The frequency of this mixing may vary over the duration of a project, but will generally not be more frequent than once a week.

### **WASTE APPLICABILITY:**

The MBI bioremediation products are specifically targeted for the contaminant groups most frequently encountered; including products for total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), other aromatic and chlorinated hydrocarbons, gasolines, crude oils, and jet fuels. The M-1000™ products have been applied in a number of different ways. The product has been used successfully in a variety of in situ and ex situ applications, but has also been applied as part of a bioreactor process, in land farms, in biopiles, and in pump-and-treat scenarios. According to the MBI, it apparently works well as an augmentation to other methods or as a stand-alone solution.

### **STATUS:**

The MBI bioaugmentation technology was accepted into the SITE Demonstration Program in 1999. A demonstration is currently in progress at the Lower Colorado River Authority (LCRA) Goldthwaite, Texas, substation. At this site PCB-contaminated soil is being treated with M-1000PCB™ product in an approximate 16- × 8- × 2-ft treatment cell. The overall goal of the project is to reduce PCB concentrations in the soil to a levels of 50 mg/kg or less, on a dry weight basis of the original soil, thus enabling the LCRA to dispose of their soils in a less costly in-state landfill (as opposed to a TSCA landfill).

The SITE Program is conducting soil sampling to evaluate the effectiveness of the MBI technology for treating the PCBs in the soil. The LCRA is performing periodic rototilling of the soil within the treatment cell (see photograph below). As of August 2001, a total of four sampling events have been completed. These included a baseline sampling event conducted in August 2000 to establish pretreatment PCB levels, and three Intermediate sampling events for tracking treatment progress. These intermediate events were conducted in October and December of 2000, and in June of 2001. A final sampling event is scheduled for October 2001.

### **FOR FURTHER INFORMATION:**

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